



**INTERNATIONAL CIVIL AVIATION ORGANIZATION
AFI PLANNING AND IMPLEMENTATION REGIONAL GROUP
NINETEENTH MEETING (APIRG/19)
(Dakar, Senegal, 28 to 31 October 2013)**

Agenda Item 3.0: Performance Framework for Regional Air Navigation Planning and Implementation

3.0 Regional and National Performance Framework

**REVIEW OF THE REPORT OF THE SEVENTH
MEETING OF THE AFI TRAFFIC FORECASTING GROUP (AFI TFG/7)**

(Presented by Secretariat)

SUMMARY
<p>This paper presents a brief summary of the forecasts and analyses provided by the Seventh Meeting of the AFI Traffic Forecasting Group (AFI TFG) which was held in Nairobi, Kenya from 27 to 30 August 2013.</p> <p>Action by the APIRG/19 meeting is at Paragraph 3.</p>
<p>REFERENCE(S):</p> <p>Report of the Seventh Meeting of the AFI Traffic Forecasting Group (Nairobi, Kenya, 27-30 August 2013)</p>
<p>Related ICAO Strategic Objective(s): All.</p>

1. INTRODUCTION

1.1 The ICAO Africa-Indian Ocean Traffic Forecasting Group (AFI TFG) was established in 1998 with the objective of developing traffic forecasts and other planning parameters in support of the planning of air navigation services in the AFI Region. The terms of reference of the AFI TFG are provided as **Appendix A** to this working paper. The Group's activities are serviced and coordinated by the ICAO Secretariat at Headquarters, in close consultation with the Eastern and Southern Africa and Western and Central African Regional Offices. The Group has so far held seven meetings in 1998, 2001, 2003, 2006, 2009, 2011 and 2013. The forecasts developed by the AFI TFG are made available on the ICAO website.

1.2 The forecasts developed by the Group were used to justify the AFI Planning and Implementation Regional Group (APIRG) decision to reduce the number of Areas of Routing for the AFI Region from ten (10) to six (6).

1.3 This working paper provides a summary of the forecasts and analyses prepared by the Seventh meeting of the AFI TFG which was held in the premises of the ICAO Eastern and Southern African Regional Office in Nairobi, Kenya from 27 to 30 August 2013.

2. DISCUSSION

MAJOR ROUTE GROUPS TO, FROM AND WITHIN THE AFRICAN REGION

2.1 Traffic forecasts developed by the AFI TFG were provided on the basis of route groups to, from and within the African region. The major route groups correspond to the following region-pairs:

- a) Africa – Europe;
- b) Africa – Middle East;
- c) Africa – Asia/Pacific;
- d) Africa – North America; and
- e) Intra Africa

2.2 The above regions are ICAO statistical regions as shown at **Appendix B** to this working paper.

FORECASTING METHODOLOGY

2.3 The AFI TFG considered that demand for air travel was primarily determined by income levels, demographics and the price of air travel. Gross Domestic Product (GDP) was used as an explanatory variable as it was deemed to have maximum impact on demand for passenger travel. It was also assumed that the general political and economic climate affects air traffic growth; however, no specific assumptions were made about possible political and economic scenarios beyond those implicit in the basic GDP growth rates' forecast.

2.4 The following forecast horizons have been considered:

- a) Medium-term forecasts (2012-2017)
- b) Long-term forecasts (2017-2032)

2.5 The approach adopted for every route-group can be described as follows:

- a) Develop econometric models explaining the growth of passenger air traffic using historical data;
- b) Develop aggregate passenger air traffic forecasts for each of the major route groups using appropriate models and judgement;
- c) Analyze the historical trends of other parameters for each route-group: total seats offered, average aircraft capacity (seats per aircraft), average load factor, total passengers carried, as well as aircraft movements compiled by ICAO supplemented by data from IATA, Official Airline Guide (OAG) and other sources; and
- d) Derive aircraft movement forecasts based on assumptions about future trends in average aircraft capacity and load factors.

PASSENGER TRAFFIC FORECASTS

2.6 Passenger air traffic to, from and within the African region on the five major route groups for the period 2012-2032 is expected to increase at an average annual rate of 7.2 per cent. The Intra-Africa route group is expected to experience the highest average annual growth rate of 9.4 per cent per annum, followed by Africa-Middle East, Africa-Asia/Pacific, Africa-North America and Africa-Europe route groups with growth rates of 8.6 per cent, 6 per cent, 5.5 per cent and 5 per cent, respectively, for the period concerned as illustrated in **Table 1** below.

TABLE 1

PASSENGER FORECAST TO THE YEAR 2032
(Thousands of passengers carried)

Route group	2012	2017	2032	Average annual growth rate (%)		
				2012-2017	2017-2032	2012-2032
Africa - North America	1 360	1 815	3 939	5.9	5.3	5.5
Africa - Europe	44 247	55 257	117 527	4.5	5.2	5.0
Africa - Middle East	19 054	29 186	99 007	8.9	8.5	8.6
Africa - Asia/Pacific	3 066	4 252	9 843	6.8	5.8	6.0
Intra Africa	19 383	31 706	117 643	10.3	9.1	9.4
TOTAL	87 111	122 216	347 960	7.0	7.2	7.2

AIRCRAFT MOVEMENT FORECASTS

2.7 Having established the passenger traffic growth rates for each route group, forecasts of aircraft movement growth rates for the period 2012-2032 were developed using the methodology outlined in section 6 and the assumptions related to the future evolution of load factors and average aircraft seats over the same period. Historical trends from the past decade for these two elements were examined carefully and their growth patterns were kept fairly consistent with their past behaviour.

2.8 The estimated aircraft movement forecasts for the period 2012-2032 and the respective growth rates are given in **Table 2** below.

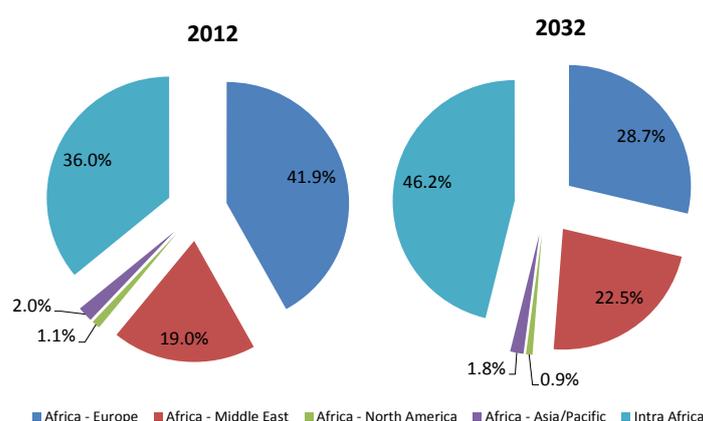
TABLE 2
AIRCRAFT MOVEMENT FORECAST TO THE YEAR 2032

Route group	2012 (1)	Forecast		Average Annual Growth (%)		
		2017	2032	2012-2017	2017-2032	2012-2032
Africa - Europe	304 458	385 796	742 779	4.8	4.5	4.6
Africa - Middle East	137 921	203 072	582 358	8.0	7.3	7.5
Africa - North America	7 924	10 434	22 123	5.7	5.1	5.3
Africa - Asia/Pacific	14 711	20 277	45 643	6.6	5.6	5.8
Intra Africa	261 224	371 063	1 194 087	7.3	8.1	7.9
Total	726 238	990 642	2 586 990	6.4	6.6	6.6

(1) OAG data

2.9 The total aircraft movements to, from and within the African Region are forecast to increase from some 726.2 thousand in 2012 to about 2 587 thousand in 2032 at an average annual growth rate of 6.6 per cent. Aircraft movements will grow the fastest within Intra-Africa, followed by Africa-Middle East and Africa-Asia/Pacific. The share of each route group in the total number of aircraft movements is depicted in **Figure** below.

FIGURE
AIRCRAFT MOVEMENT SHARES BY ROUTE GROUP 2012 AND 2032



CITY-PAIR AIRCRAFT MOVEMENT FORECASTS

2.10 Using the 2012 OAG data as the baseline, the AFI TFG estimated the aircraft movement forecasts for the top 25 city-pairs within each of the route groups identified in paragraph 2.1 above. The aircraft movements' forecasts for the city-pairs of the route groups concerned are provided in detail the Report of the AFI TFG/7 Meeting.

PEAK-PERIOD PARAMETERS FOR FLIGHT INFORMATION REGION (FIR) TRAFFIC

2.11 The AFI TFG analysed the flight information region (FIR) traffic data provided by ASECNA for its managed centres and the Seychelles FIR for the year 2012 covering annual, monthly, daily and hourly traffic parameters as well as traffic densities. The evolution of the traffic serviced by the Dar es Salaam FIR over the period 2001-2012 and the monthly traffic volumes for the year 2012 were also analysed. These are provided in detail in the Report of the AFI TFG/7 Meeting.

SCOPE OF THE WORK OF THE AFI TRAFFIC FORECASTING GROUP

2.12 The Group was briefed on Recommendation 6/11 (*Regional performance framework–Alignment of air navigation plans and regional supplementary procedures*) of the ICAO Twelfth Air Navigation Conference (AN-Conf/12) on the alignment of regional air navigation plans (ANPs) and regional supplementary procedures (SUPPs). The implementation of this recommendation will result in the transfer of seven of its present FIRs, i.e. Alger, Cairo, Canarias, Casablanca, Khartoum, Tripoli and Tunis FIRs, to EUR and MID ANPs.

2.13 The Group also noted the expectation of the AFI Planning and Regional Implementation Group (APIRG) to be provided with the forecasts for the homogeneous ATM areas and major traffic flows/routing areas defined in the AFI Region, in accordance with the Group's Terms of reference. These homogeneous ATM areas and major traffic flows/routing areas are provided at **Appendices C-1** and **C-2** to this working paper. The AFI TFG had made an attempt to meet this expectation in 2006, however, the forecasts were developed based on the OAG data, while more reliable forecasts can only be developed using the relevant FIR data and these data are not easily available.

2.14 During the discussions, it was noted the need for States to fully participate in the ICAO Statistics Programme and provide the relevant FIR data identified by the AFI TFG to enable the development of reliable forecasts for traffic flows. The meeting may wish to note that the Tenth Statistics Division Meeting (STA/10, 2009) had decided to discontinue Form L (En-Route Services Traffic Statistics), and recommended the creation of one harmonized, global aircraft movement database which would enable ICAO to perform traffic analyses that address the changing requirements in air traffic management and air navigation for potential applications; and request ICAO to consider the implementation of an appropriate Form which could help address specific regional needs.

3. CONCLUSION

3.1 The meeting is invited to:

- a) Note the work done and the medium term (2012-2017) and long term (2017-2032) forecasts developed by the AFI TFG, as summarized in this working paper;
- b) Note that the AFI forecasts are being provided according to region-pairs based on the ICAO Statistical Regions, and that these region-pairs do not necessarily correspond to the ATM areas of routing defined by the APIRG;
- c) Reiterate the need for the forecasts developed by the AFI TFG to also cover traffic flows taking into account the area routings in the AFI Air Navigation Plan, as well as other planning requirements of the region;
- d) Request the AFI TFG to explore at its next meeting the way to develop forecasts referred in c) above and the resources needed as well as to identify the FIR data requirements for their development;
- e) Request ICAO to implement an improved Form L (En-Route Services Traffic Statistics) to accommodate specific regional needs for traffic analyses in a changing environment;
- f) Request States to fully participate in the ICAO Statistics Programme and provide the relevant FIR data identified by the AFI TFG to enable the development of reliable forecasts for traffic flows; and

- g) Review the terms of reference the AFI Traffic Forecasting Group, and provide guidance as necessary regarding its future work programme.

APPENDIX A

TERMS OF REFERENCE OF THE AFI TRAFFIC FORECASTING GROUP

(As defined by APIRG/14 Meeting)

The terms of reference of the Africa Indian Ocean Traffic Forecasting Group (AFI TFG) are to:

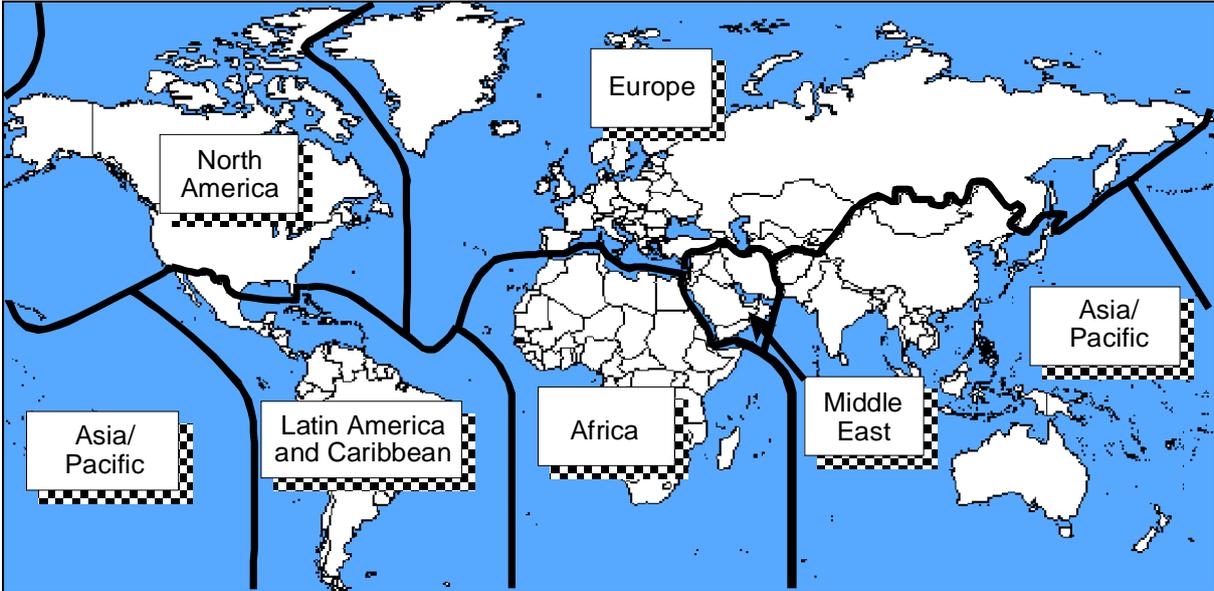
- a) Identify the data requirements and sources for the development of medium term and long-term forecasts of air traffic to, from and within the AFI Region;
- b) Develop medium and long-term passenger, freight and total aircraft movement forecasts for the AFI region, to support the air navigation system planning taking into consideration that:
 - 1) The forecasts should be developed using a methodology which links passenger and freight demand with aircraft movement forecasts directly and in a consistent manner;
 - 2) The forecasts should also cover traffic flows taking into account the area routings in the AFI Air Navigation Plan as well as other planning requirements of the region.
- c) Develop major city-pairs forecasts;
- d) Analyze the distribution of the aircraft fleet in the AFI region, including seat size and load factors; and
- e) Analyze the data collected from selected flight information regions (FIRs) to establish peak period parameters required for planning purposes.

In order to make efficient use of the resources available for the conduct of forecasts and economic analysis, close coordination among the various sub-groups of the APIRG concerned and the AFI TFG is required.

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APPENDIX B

ICAO STATISTICAL REGIONS



International boundaries shown on this map do not imply official endorsement or acceptance by ICAO.

APPENDIX C-1

AFI HOMOGENEOUS AREAS OF ROUTING & MAJOR TRAFFIC FLOWS

<i>Areas of routing (AR)</i>	<i>Traffic Flows</i>	<i>Areas involved</i>	<i>Type of area covered</i>	<i>Remarks</i>
AR1	Europe — South America (EUR/SAM) (oceanic)	Atlantico ¹ , Canarias, Casablanca, Dakar Oceanic, Recife, Sal Oceanic	Oceanic en route low density in southern part and oceanic high density in northern part	Major traffic flow EUR/SAM
AR2	Atlantic Ocean interface between the AFI, NAT and SAM Regions	Accra, Dakar, Johannesburg, Luanda, Sal	Oceanic en route low density	Homogeneous ATM area AFI/NAT/SAM
AR3	Europe — Eastern Africa routes including the area of the Indian Ocean	Addis Ababa, Antananarivo, Asmara, Cairo, Dar es-Salaam, Entebbe, Khartoum, Mauritius, Mogadishu, Nairobi, Seychelles, Tripoli	Continental en route/ oceanic low density	Major traffic flow AFI/EUR
AR4	Europe to Southern Africa	Algiers, Beira, Brazzaville, Cape Town, Gaborone, Harare, Johannesburg, Kano, Kinshasa, Lilongwe, Luanda, Lusaka, N'Djamena, Niamey, Tripoli, Tunis, Windhoek	Continental en route low density	Major traffic flow AFI/EUR
AR5	Continental Western Africa including coastal areas	Accra, Addis Ababa, Brazzaville, Dakar, Dar-es-Salaam, Entebbe, Kano, Khartoum, Kinshasa, Nairobi, Ndjamen, Niamey, Roberts	Continental/oceanic low density	Homogeneous area AFI
AR6	Trans-Indian	Antananarivo, Bombay ¹ , Johannesburg Male ¹ , Mauritius, Melbourne ¹ , Seychelles	Oceanic high density	Homogeneous ATM area AFI/ASIAPAC

Note: (1) Flight Information Region outside the AFI Region.

APPENDIX C-2

AFI HOMOGENEOUS AREAS OF ROUTING & MAJOR TRAFFIC FLOWS

